

CHROMOSOME NUMBERS IN BOLIVIAN GRASSES (GRAMINEAE)¹

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ABSTRACT

Chromosome numbers are reported for 59 collections of grasses from Bolivia representing 43 species and 21 genera. First chromosome counts are reported for the following six species: *Imperata tenuis*, $2n = 20$; *Paspalum acuminatum*, $2n = 40$; *P. kempffii*, $2n = 40$; *P. lenticulare*, $2n = 40$; *P. lineare*, $2n = 80$; *P. macedoi*, $2n = 40$. Counts differing from previously reported numbers are given for the following five species: *Gymnopogon spicatus*, $2n = 40$; *Leersia hexandra*, $2n = 72$; *Pennisetum setosum*, $2n = 45$; *Setaria vulpiseta*, $2n = 54$; *Thrasya petrosa*, $2n = 20$.

Information on chromosome numbers in carefully vouchered specimens is of fundamental importance in understanding plant phylogeny, particularly in regard to polyploid taxa (Raven, 1975; Davidse et al., 1986). An understanding of the relationships between polyploidy and apomixis in several tropical grass genera (e.g., *Paspalum*, *Panicum*, *Dichanthium*, *Bothriochloa*, and *Brachiaria*) is required by plant breeders and other investigators studying plant reproductive biology (Connor, 1979; Quarín & Norrmann, 1987). Numerous chromosome counts have been obtained over the past 30 years; nonetheless, species native to certain geographic regions, such as central South America, remain virtually unstudied. Chromosome numbers for Bolivian grasses have been reported only by two studies; Bowden & Senn (1962) reported counts for 10 species from the eastern lowlands, while Killeen (1990) obtained meiotic counts for 32 genera and 48 species from the Brazilian Shield region of Santa Cruz. This paper provides complementary information to Killeen's (1990) study.

Chromosome counts were determined to be new or different by comparison to Killeen (1990), Honfi et al. (1990), and Dubcosky & Zuloaga (1991) or, where not specifically cited, from the summary listings of Darlington & Wylie (1956), Ornduff (1967, 1968, 1969), Fedorov (1969), Moore (1973, 1977), Goldblatt (1981, 1984, 1985, 1988), and Goldblatt & Johnson (1990).

MATERIALS AND METHODS

Plants were obtained from seed collected by Killeen in natural populations in eastern lowland Bolivia. Most accessions originated from the Brazilian Shield region of Santa Cruz (i.e., Prov. Ñuflo de Chávez), but several species were collected from the sand savannas of the piedmont in western Santa Cruz (Prov. Andrés Ibáñez) or the inundated savannas of the western Beni (Table 1).

Chromosome counts were made from mitotic squashes of root-tips collected from potted plants. Root-tips were collected between 8:00 and 10:00 A.M. and pretreated for two hours with alpha-bromonaftalene at room temperature. Subsequently, the material was hydrolyzed with a 1 N solution of HCl at 60°C for ten minutes and stained with fuchsin; squashes were made with a drop of aceto-orcein. An average of three plants per accession were scored. A complete list of species, voucher specimens for individual accessions, and locality data is provided in Table 1; a list of synonyms is provided by Killeen (1990). Replicate specimens of all accessions cited in Table 1 have been deposited at CTES and ISC; partial sets of Killeen collections are at LPB, MO, SI, US, and USZ.

RESULTS AND DISCUSSION

This paper presents the chromosome numbers, as determined by mitotic divisions, for 59 separate

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TABLE 1. Zygotic chromosome number ($2n$), locality of origin, and collection number of 43 Bolivian grass species.

Species	$2n$	Origin, voucher, and figure references
<i>Andropogon lateralis</i> Nees	60	Dept. Santa Cruz: Prov. Andrés Ibáñez, Pampa Viru Viru, 1 km E of the International Airport, 17°40'S, 63°10'W, 400 m, <i>Killeen 1550</i>
<i>Arundinella hispida</i> (Willd.) Kuntze	20	Dept. Beni: Prov. Ballivian, Estación Biológica del Beni, Estancia Porvenir, 40 km E of San Borja, 14°35'S, 66°30'W, 200 m, <i>Killeen 2593</i> (Fig. 1)
<i>Axonopus chrysoblepharis</i> (Lag.) Chase	20	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Pueblo de Concepción on road around reservoir, 16°03'S, 62°10'W, 500 m, <i>Killeen 2011A</i>
<i>Axonopus compressus</i> (Sw.) P. Beauv.	40	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia Las Madres, 9 km N of Concepción, 16°00'S, 62°00'W, 500 m, <i>Killeen 1751</i>
<i>Axonopus fissifolius</i> (Raddi) Kuhlmann	20	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia Viera, 2 km S of Concepción, 16°08'S, 62°05'W, 500 m, <i>Killeen 2275</i>
<i>Elionurus muticus</i> (Spreng.) Kuntze	20	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia Santa María, 10 km S of Concepción on road to Lomerío, 16°13'S, 62°00'W, 500 m, <i>Killeen 2187</i>
<i>Eriochloa distachya</i> HBK	18	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia Santa María, 7 km S of Concepción on road to Lomerío, 16°10'S, 62°00'W, 500 m, <i>Killeen 2441</i>
<i>Gouinia virgata</i> (C. Presl) Scribn.	40	Dept. Santa Cruz: Prov. Ñuflo de Chávez, 17 km N of Concepción on road to San Ignacio, 15°50'S, 62°00'W, 400 m, <i>Killeen 1885</i>
<i>Gymnopogon spicatus</i> (Spreng.) Kuntze	40**	Dept. Santa Cruz: Prov. Ñuflo de Chávez, 3 km S of Concepción on road around reservoir, 16°03'S, 62°10'W, 500 m, <i>Killeen 2017</i>
<i>Imperata tenuis</i> Hack.	20*	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia Santa María, 10 km S of Concepción on road to Lomerío, 16°13'S, 62°00'W, 500 m, <i>Killeen 2482</i> (Fig. 2)
<i>Lasiacis sorghoidea</i> (Desv.) Hitchc.	36	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Rancho Puesto Nuevo, 40 km S of Concepción on road to Lomerío, 16°25'S, 62°00'W, 700 m, <i>Killeen 2332</i> (Fig. 3)
<i>Leersia hexandra</i> Sw.	72**	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia Viera, 2 km S of Concepción, 16°08'S, 62°05'W, 480 m, <i>Killeen 2416</i>
<i>Microchloa indica</i> (L. f.) P. Beauv.	12	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Comunidad Puesto Nuevo, 60 km S of Concepción on road to Lomerío, 16°25'S, 62°00'W, 450–700 m, <i>Killeen 1826</i>
<i>Oryza rufipogon</i> Griffith	24	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia Santa María, 8 km S of Concepción on road to Lomerío, 16°10'S, 62°00'W, 500 m, <i>Killeen 2086</i>
<i>Panicum laxum</i> Sw.	40	Dept. Santa Cruz: Prov. Andrés Ibáñez, Pampa Viru Viru, 1 km E of International Airport, 17°40'S, 63°10'W, 400 m, <i>Killeen 1554</i>
<i>Panicum laxum</i> Sw.	40	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia Salta, 10 km S of Concepción on road to Lomerío, 16°13'S, 62°00'W, 500 m, <i>Killeen 2286</i> (Fig. 4)
<i>Panicum mertensii</i> Roth ex Roem. & Schult.	36	Dept. Santa Cruz: Prov. Ñuflo de Chávez, 20 km W of Santa Rosa de la Roca on road to San Ignacio, 15°50'S, 61°40'W, 300 m, <i>Killeen 1745</i>
<i>Panicum olyroides</i> HBK	36	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia El Recreo, 2 km N of Concepción, 16°02'S, 62°08'W, 480 m, <i>Killeen 2398</i> (Fig. 5)
<i>Panicum trichanthum</i> Nees	36	Dept. Santa Cruz: Prov. Andrés Ibáñez, Pampa Viru Viru, 1 km E of the International Airport, 17°40'S, 63°10'W, 400 m, <i>Killeen 1556</i>

TABLE 1. Continued.

Species	2n	Origin, voucher, and figure references
<i>Paspalum acuminatum</i> Raddi	40*	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia San Sebastián, 25 km S of Concepción on road to Lomerío, 16°20'S, 62°00'W, 500 m, <i>Killeen 2325</i>
<i>Paspalum erianthum</i> Nees ex Trin.	80	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia Salta, 10 km S of Concepción on road to Lomerío, 16°13'S, 62°00'W, 460 m, <i>Killeen 1194</i>
<i>Paspalum erianthum</i> Nees ex Trin.	80	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia Santa María, 10 km S of Concepción on road to Lomerío, 16°13'S, 62°00'W, 500 m, <i>Killeen 2191</i>
<i>Paspalum guenoarum</i> Arechav.	40	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia El Recreo, 2 km N of Concepción, 16°13'S, 62°00'W, 500 m, <i>Killeen 2390</i>
<i>Paspalum guenoarum</i> Arechav.	40	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia El Recreo, 2 km N of Concepción, 16°13'S, 62°00'W, 500 m, <i>Killeen 2394</i> (Fig. 6)
<i>Paspalum humigenum</i> Swallen	20	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia La Pachanga, 5 km S of Concepción on road to Lomerío, 16°08'S, 62°05'W, 500 m, <i>Killeen 2246</i>
<i>Paspalum intermedium</i> Munro ex Morong & Britton	40	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia Viera, 2 km S of Concepción on road to Lomerío, 16°08'S, 62°05'W, 500 m, <i>Killeen 1631</i>
<i>Paspalum intermedium</i> Munro ex Morong & Britton	40	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia La Pachanga, 5 km S of Concepción on road to Lomerío, 16°08'S, 62°00'W, 500 m, <i>Killeen 2258</i>
<i>Paspalum kempffii</i> Killeen	40*	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia La Pachanga, 5 km S of Concepción on road to Lomerío, 16°13'S, 62°05'W, 500 m, <i>Killeen 2272</i>
<i>Paspalum lenticulare</i> HBK	40*	Dept. Santa Cruz: Prov. Andrés Ibáñez, Pampa Viru Viru, 1 km E of International Airport, 17°40'S, 63°10'W, 400 m, <i>Killeen 1557</i>
<i>Paspalum lenticulare</i> HBK	40	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia Salta, 10 km S of Concepción on road to Lomerío, 16°10'S, 62°05'W, 500 m, <i>Killeen 2270</i>
<i>Paspalum lenticulare</i> HBK	40	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia San Sebastián, 25 km S of Concepción on road to Lomerío, 16°20'S, 62°00'W, 500 m, <i>Killeen 2322</i>
<i>Paspalum lenticulare</i> HBK	40	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia El Recreo, 2 km N of Concepción, 16°13'S, 62°00'W, 500 m, <i>Killeen 2396</i>
<i>Paspalum limbatum</i> Henrard	20	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia Viera, 2 km S of Concepción on road to Lomerío, 16°13'S, 62°05'W, 500 m, <i>Killeen 1622</i>
<i>Paspalum limbatum</i> Henrard	20	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia La Pachanga, 5 km S of Concepción on road to Lomerío, 16°08'S, 62°05'W, 500 m, <i>Killeen 2276</i>
<i>Paspalum limbatum</i> Henrard	20	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia Salta, 10 km S of Concepción on road to Lomerío, 16°08'S, 62°00'W, 500 m, <i>Killeen 2453</i> (Fig. 7)
<i>Paspalum lineare</i> Trin.	80*	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia La Pachanga, 5 km S of Concepción on road to Lomerío, 16°08'S, 62°05'W, 500 m, <i>Killeen 2218</i>
<i>Paspalum macedoi</i> Swallen	40*	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia Las Madres, 9 km N of Concepción on road to San Ignacio, 16°00'S, 62°00'W, 500 m, <i>Killeen 1796</i>
<i>Paspalum maculosum</i> Trin.	40	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia Salta, 10 km S of Concepción on road to Lomerío, 16°13'S, 62°00'W, 500 m, <i>Killeen 2282</i> (Fig. 8)

TABLE 1. Continued.

Species	2n	Origin, voucher, and figure references
<i>Paspalum malacophyllum</i> Trin.	40	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia San Josecito, 8 km S de Concepción on road to Lomerío, 16°02'S, 62°05'W, 490 m, <i>Killeen 1918</i>
<i>Paspalum malacophyllum</i> Trin.	40	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia El Recreo, 2 km N of Concepción, 16°12'S, 62°08'W, 500 m, <i>Killeen 2449</i>
<i>Paspalum minus</i> E. Fourn.	50	Dept. Santa Cruz: Prov. Andrés Ibáñez, Pampa Viru Viru, 1 km E of the International Airport, 17°40'S, 63°10'W, 500 m, <i>Killeen 1584</i>
<i>Paspalum plenum</i> Chase	40	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia Viera, 2 km SE of Concepción, 16°13'S, 62°00'W, 500 m, <i>Killeen 2317</i>
<i>Paspalum plicatulum</i> Michx.	40	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia La Pachanga, 5 km S of Concepción on road to Lomerío, 16°08'S, 62°05'W, 480 m, <i>Killeen 2444</i>
<i>Paspalum plicatulum</i> Michx.	40	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia Salta, 10 km S of Concepción on road to Lomerío, 16°13'S, 62°00'W, 500 m, <i>Killeen 2455</i>
<i>Pennisetum setosum</i> (Sw.) Rich.	45**	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Comunidad Puesto Nuevo, 30 km S of Concepción on road to Lomerío, 16°25'S, 62°00'W, 700 m, <i>Killeen 1821</i>
<i>Pharus lappulaceus</i> Aubl.	24	Dept. Santa Cruz: Prov. Ñuflo de Chávez, 17 km S of Concepción on Road to San Ignacio, 15°50'S, 62°00'W, 400 m, <i>Killeen 1890</i>
<i>Saccharum trinii</i> Hack.	60	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia La Pachanga, 5 km S of Concepción on road to Lomerío, 16°08'S, 62°05'W, 500 m, <i>Killeen 2219</i> , chasmogamous form
<i>Saccharum trinii</i> Hack.	60	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia Salta, 10 km S of Concepción, 16°13'S, 62°00'W, 500 m, <i>Killeen 2281</i> , cleistogamous form
<i>Schizachyrium sanguineum</i> (Retz.) Alston	50	Dept. Santa Cruz: Prov. Andrés Ibáñez, Pampa Viru Viru, 1 km E of the International Airport, 17°40'S, 63°10'W, 400 m, <i>Killeen 1551</i>
<i>Schizachyrium sanguineum</i> (Retz.) Alston	50	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Pueblo de Concepción, the laguna west of town, 16°05'S, 62°00'W, 500 m, <i>Killeen 1851</i>
<i>Schizachyrium sanguineum</i> (Retz.) Alston	60	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Pueblo de Concepción, the laguna west of town, 16°05'S, 62°00'W, 500 m, <i>Killeen 2026</i>
<i>Schizachyrium sanguineum</i> (Retz.) Alston	70	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Pueblo de Concepción, the laguna west of town, 16°05'S, 62°00'W, 500 m, <i>Killeen 2026</i>
<i>Schizachyrium sanguineum</i> (Retz.) Alston	60	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia Salta, 10 km S of Concepción, 16°13'S, 62°00'W, 500 m, <i>Killeen 2095</i> (Fig. 9)
<i>Setaria parviflora</i> (Poir.) Kerguelen	36	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia Salta, 10 km S of Concepción on road to Lomerío, 16°13'S, 62°00'W, 500 m, <i>Killeen 2273</i>
<i>Setaria vulpiseta</i> (Lam.) Roem. & Schult.	54**	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia San Sebastián, 25 km S of Concepción on road to Lomerío, 16°20'S, 62°00'W, 500 m, <i>Killeen 2318</i> (Fig. 10)
<i>Sorghastrum minarum</i> (Nees) Hitchc.	20	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia El Recreo, 2 km N of Concepción, 16°02'S, 62°08'W, 480 m, <i>Killeen 2387</i>
<i>Sorghastrum setosum</i> (Griseb.) Hitchc.	20	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia Salta, 10 km S of Concepción on road to Lomerío, 16°13'S, 62°00'W, 500 m, <i>Killeen 2306</i> (Fig. 11)

TABLE 1. Continued.

Species	2n	Origin, voucher, and figure references
<i>Thrasya crucensis</i> Killeen	20	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Comunidad Puesto Nuevo, 40 km S of Concepción on road to Lomerío, 16°25'S, 62°00'W, 700 m, <i>Killeen 2334</i>
<i>Thrasya petrosa</i> (Trin.) Chase	40	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia Salta, 10 km S of Concepción on road to Lomerío, 16°13'S, 62°00'W, 500 m, <i>Killeen 1953</i>
<i>Thrasya petrosa</i> (Trin.) Chase	20**	Dept. Santa Cruz: Prov. Ñuflo de Chávez, Estancia Viera, 2 km S of Concepción on road to Lomerío, 16°08'S, 62°05'W, 500 m, <i>Killeen 2418</i>

* First count for this taxon.

** Count different from previous ones for this taxon.

accessions of 43 species in 21 genera and seven tribes of Gramineae. Chromosome counts for six species are reported for the first time, while an additional five species were discovered to have chromosome numbers different from those previously reported. The results of mitotic counts are presented in Table 1; selected squashes are presented in Figures 1–11. Selected species are discussed in detail in the following paragraphs.

Arundinella hispida was documented as $2n = 20$ (Fig. 1) in agreement with a previous report by Gould & Soderstrom [1967, sub *Arundinella confinis* (Schult.) Hitchc. & Chase].

An accession of *Gymnopogon spicatus* was documented as being tetraploid ($2n = 40$, for *Killeen 2017*), which contrasts to the diploid accession (*Killeen 2481*) reported by Killeen (1990). The two accessions were collected within 5 km of one another near the village of Concepción.

Imperata tenuis was documented as a diploid with $2n = 20$ (Fig. 2); this is the first chromosome count for the species. The base of $x = 10$ conforms with other reports for the genus.

Leersia hexandra is a pantropical species, and since Ramiah (1935) numerous investigators have reported it as uniformly $2n = 48$. Surprisingly, the same population near Concepción (voucher *Killeen 2416*) was found to contain both hexaploid plants ($2n = 72$) by the mitotic counts reported here, as well as tetraploid plants ($2n = 48$) by the meiotic preparations previously reported by Killeen (1990).

Paspalum is the most speciose grass genus in the Neotropics and is, likewise, the most abundant genus in eastern lowland Bolivia. Consequently, most of the counts reported here belong to this genus. New counts are reported for *P. acuminatum*, *P. macedoi*, *P. kempffii*, and *P. lenticulare*,

all of which are $2n = 40$, as well as for *P. lineare*, which is $2n = 80$.

Pennisetum setosum is a neotropical species with previous counts of $2n = 36$, 72, and 54 chromosomes; this is the first report of a pentaploid $2n = 45$ cytotype. Nonetheless, plants were relatively fecund in natural populations, and plants raised in cultivation at Corrientes were fully fertile. Presumably the species, or at least this accession, reproduces via apomixis, a phenomenon that has been reported for the genus (Dujardin & Hanna, 1984).

This is the first reliable count for *Saccharum trinii*. A previous study reported that $2n$ was about 60 (Molina, 1981), and that figure has been verified by this study. Killeen (1990) reported that this species existed as two intergrading phenological phenotypes. Early-blooming chasmogamy was induced by fire, while late-blooming cleistogamy occurred in nonburned individuals. Both phenotypes were documented as $2n = 60$ cytotypes (Table 1).

Schizachyrium sanguineum is a morphologically and cytologically variable taxon with a pantropical distribution. Populations range from diploid to decaploid in different floras of the world. Neotropical variants have traditionally been recognized as *S. hirtiflorum* Nees or *S. semiberbis* Nees based on spikelet characteristics. The cytological information reported here reinforces the view that *S. sanguineum* (sensu lato) is best viewed as a complex of morphologically intergrading cytotypes. Plants with $2n = 50$, 60 (Fig. 9), and 70 were documented; moreover, plants with $2n = 60$ and 70 were collected from the same population (voucher *Killeen 2026*, Table 1). Aposporous apomixis was reported for the species by Carman & Hatch (1982), and this reproductive scheme may explain these polyploid polymorphisms.



FIGURES 1-11. Photomicrographs of root-tip squashes.—1. *Arundinella hispida*, $2n = 20$ (Killeen 2593).—2. *Imperata tenuis*, $2n = 20$ (Killeen 2482).—3. *Lasiacis sorghoidea*, $2n = 36$ (Killeen 2332).—4. *Panicum laxum*, $2n = 40$ (Killeen 2286).—5. *Panicum olyroides*, $2n = 36$ (Killeen 2398).—6. *Paspalum guenoarum*, $2n = 40$ (Killeen 2394).—7. *Paspalum limbatum*, $2n = 20$, (Killeen 2453).—8. *Paspalum maculosum*, $2n = 40$ (Killeen 2282).—9. *Schizachyrium sanguineum*, $2n = 60$ (Killeen 2095).—10. *Setaria vulpiseta*, $2n = 54$, (Killeen 2318).—11. *Sorghastrum setosum*, $2n = 20$ (Killeen 2306).

Setaria vulpiseta was documented to have a chromosome number of $2n = 54$ (Fig. 10). This differs from previous reports of $2n = 36$ for Brazilian populations (de Oliveira Freitas Sacchet, 1980).

Thrasya petrosa is another species with both diploid and tetraploid cytotypes (Table 1). This combination of ploidy levels within the same species in the closely related genus *Paspalum* is usually associated with sexuality and self-incompatibility in diploids and self-fertility coupled with pseudogamous apomixis in tetraploids (Quarín & Norrmann, 1987; Norrmann et al., 1989; Quarín, 1992). A hexaploid cytotype is also known for *Th. petrosa* from Venezuela (Davidse & Pohl, 1974). It, plus the tetraploid form from the same country, showed the meiotic irregularities often associated with apomixis.

Several of the species included in this study (*Axonopus fissifolius*, *Leersia hexandra*, *Panicum laxum*, *Paspalum guenoarum*, *Paspalum lenticulare*, *Paspalum plicatulum*, *Schizachyrium sanguineum*, and *Thrasya petrosa*) have been identified as important forage species in the cerrado and pantanal savannas of central South America (Killeen, 1991a, b). Knowledge of their taxonomy and reproductive biology are essential for their improvement via breeding programs, as well as to insure the development of appropriate range management strategies.

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